



JISBD
2019

Prodevelop

A Test Automation Case Study

From academic research to the real-world tool chain

Tanja Vos
Fernando Pastor

Ismael Torres
Ernesto Calás

Leire Etxeberria
Urtzi Markiegi
Iñigo Aldalur
Xabier Valencia

Open Universiteit
www.ou.nl



proDEVELOP
Integrating technologies

Mondragon Faculty of
Unibertsitatea Engineering

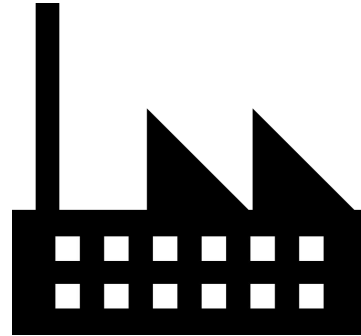
INDEX

1. MOTIVATION
2. TESTOMAT Project
3. PRODEVELOP
4. USE CASE (research outcome for industrial usage examples)
5. CONCLUSIONS
6. FUTURES LINES

MOTIVATION

communication between two different communities is always a **challenge** and **academia** and **industry** are no exception.

Despite the extensive collaboration between the industry and academia, **success stories are rare** rather than common.



MOTIVATION

There are many aspects that are beyond your control (market, institutions,...). However there is one aspect that requires special consideration: the inherent **difficulty of communication and human interaction**.

The only thing we can do is try to **come closer together** and be more emotionally intelligent when talking to each other.

Research Question:

*Is it possible
to integrate
academic research
results into industry
in a systematic way?*

TESTOMAT Project



ITEA3 call3

34 Partners (6 countries)

From October 2017 to September 2020

<https://www.testomatproject.eu/>

 <https://www.youtube.com/testomatproject>

 @TestomatProject

TESTOMAT

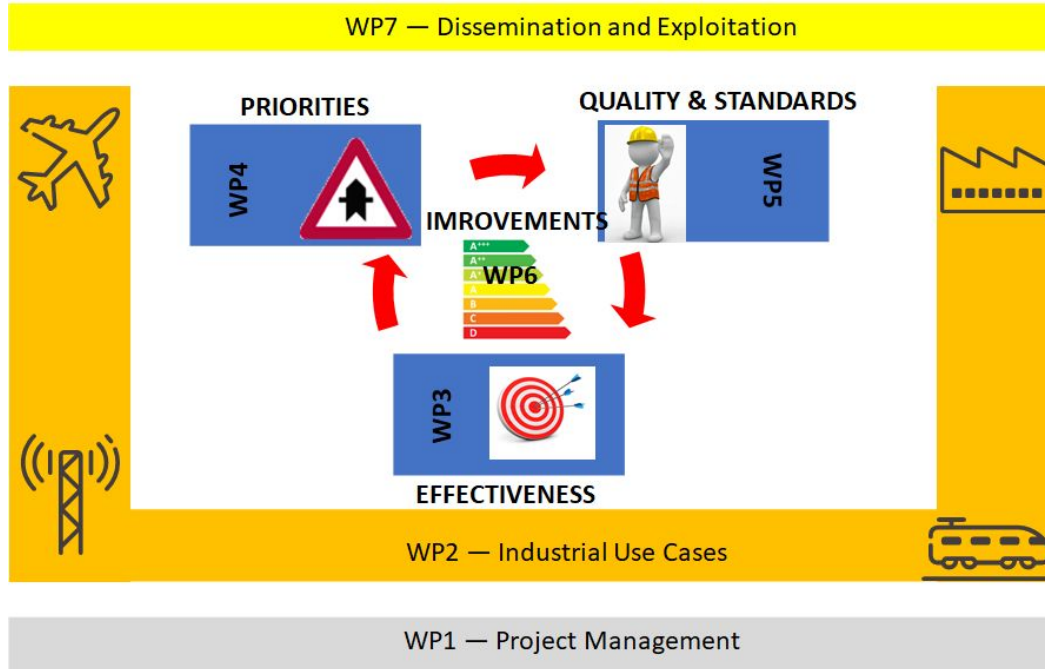
“The **Next Level** of Test Automation”

Nowadays, quality software has come to mean “**easy to adapt**” because of the constant pressure to change. Consequently, modern software teams seek a delicate **balance between** two opposing forces: **striving for reliability and striving for agility**.

The TESTOMAT project will support software teams to strike the right balance by **increasing the development speed without sacrificing quality**.

The project will ultimately result in a Test Automation Improvement Model, which will define key improvement areas in test automation, with the focus on measurable improvement steps.

TESTOMAT Project



UC9, Prodevelop,
*Effectiveness and automated non-functional
testing for continuous delivery in Port
Management Systems with multi-tenancy*

Open Universiteit
www.ou.nl



Mondragon
Unibertsitatea Faculty of
Engineering

Prodevelop - *the Company*



proDEVELOP
Integrating technologies

Spanish SME .

Establish in 1993, Prodevelop has been providing IT solutions and services highly specialized in the **Maritime Industry**. Other Sectors (civil service, agrarian, insurances).

2011 start **internationalization** (sales delegation Casablanca and Sao paulo).

Prodevelop has an employee team over **more than 80 professionals** highly qualified, and a sustainable grow and benefits during the last years.

R&D (multiplatform mobility, Geospatial technologies, IoT, software engineering)



Prodevelop - Quality

Quality & Research Policies

Prodevelop is **committed** to achieve the highest possible **quality**, providing competitive solutions through the integration among quality certifications, technology and knowledge. Following international normative makes our solutions reliable..

ISTQB, CMMI level 2 certification and the ISO 20.000. In process to obtain the certification UNE 166002.

R&D Active participation in international/ European R&D projects and collaboration with universities and research centers all over the world.



Prodevelop - *Posidonia*

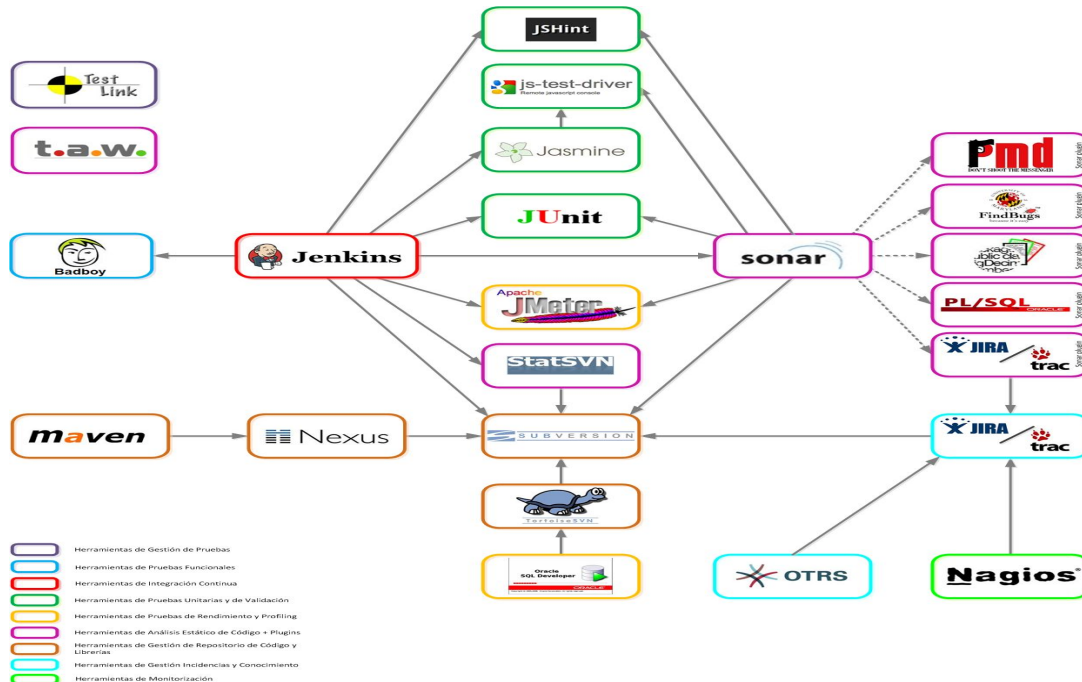
Posidonia is a Port solution suite
It's working in more than 20 ports around
the world.

- It's a very **competitive sector**. For this reason we need to provide the best solution and the R&D is a must.
- **Each port is different**, a lot of customizations and parametrizations needed.



USE CASE - Initial state

Tools used by Prodevelop at some point



- **Weekly version.**
Prodevelop updates its Posidonia PMS based products weekly.
- **Extensive set of test cases**
This leads to an extensive set of test cases ranging from business specific testing to device/container compatibility.
- **Manual Execution of the test cases**
With the product evolution currently the bug fix time is between 1-2 days for each release (5 days) dedicating 20% of the development/analysis team. Each new country implies a bug fix dedicated time of 0.75 days and each new client from a country around 1 hour of extra support/maintenance.

USE CASE - Objectives

**Improve the quality of the developed projects
by applying a better testing approach:**

1. Apply testing to **all development cycle**.
2. Integrate the testing into our process of **continuous integration**.
3. Use of new test techniques.
4. Use of tools to **automate** the execution of test cases
5. **Integration** of the testing into JIRA ticketing system
6. Test non functional requirements (OWASP, ISO 27001,...)
7. Train employees in testing (tools, certifications, programming best practices)
8. Active collaboration with research centres

USE CASE - Methodology

1. **DevOps approach**

Define a DevOps approach.

2. **Redefine testing**

Redefine the testing concepts considering Standards (ISTQB) and best practices

3. **Traceability data model**

Define complete data model that provides support for the traceability of projects

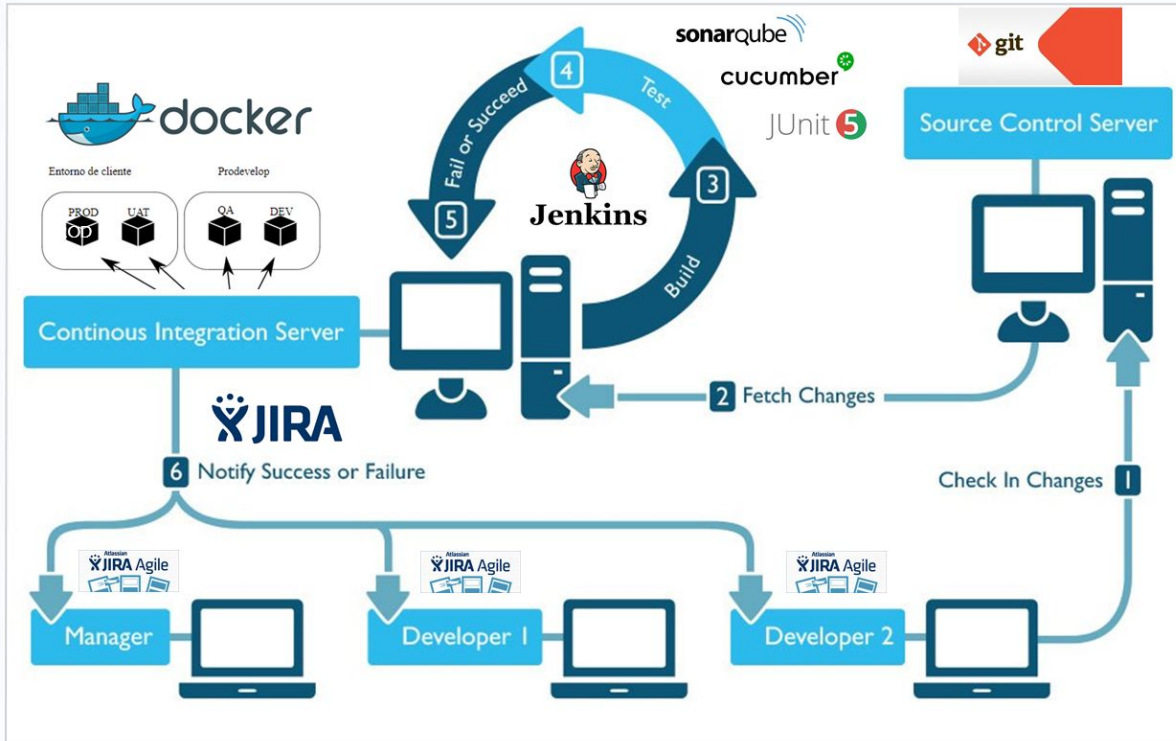
4. **New testing process**

Define a new automated testing process to ensure the quality of the developed products.

5. **Traceability and Test Automation Tools (TATAT)**

Development and integration of a tool chain to support the testing process

USE CASE - DevOps approach



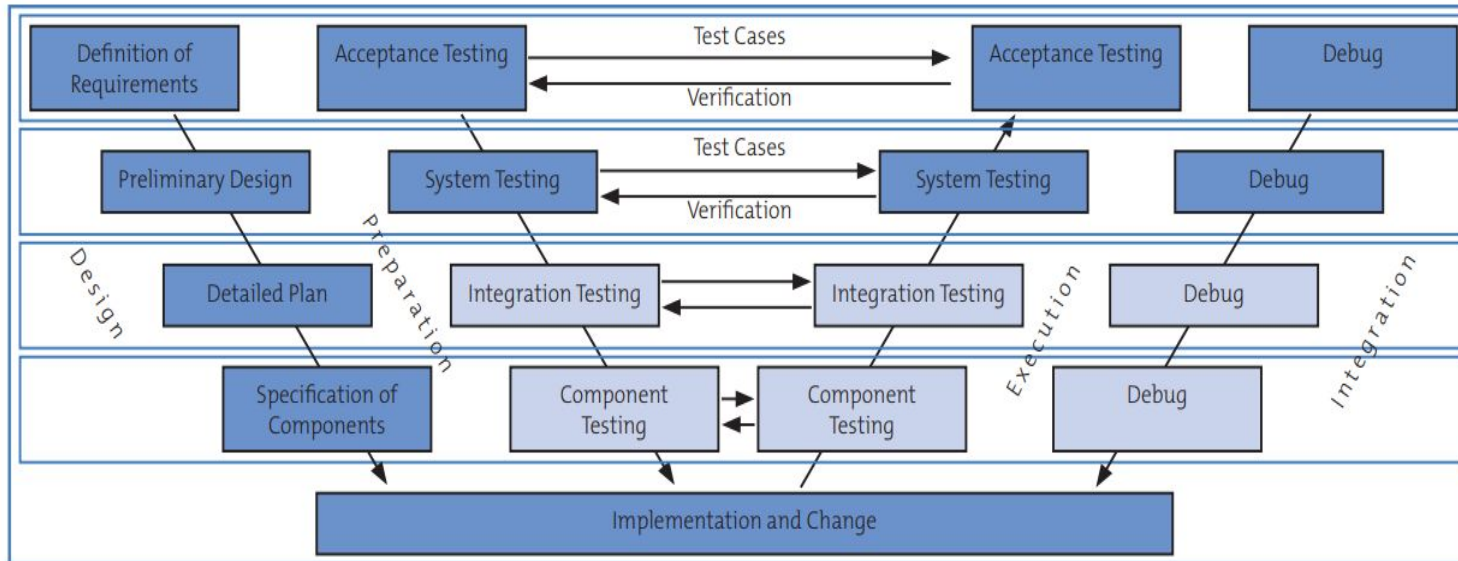
New approach

A DevOps approach with Continuous Integration and Continuous Delivery (CI/CD) has been proposed.

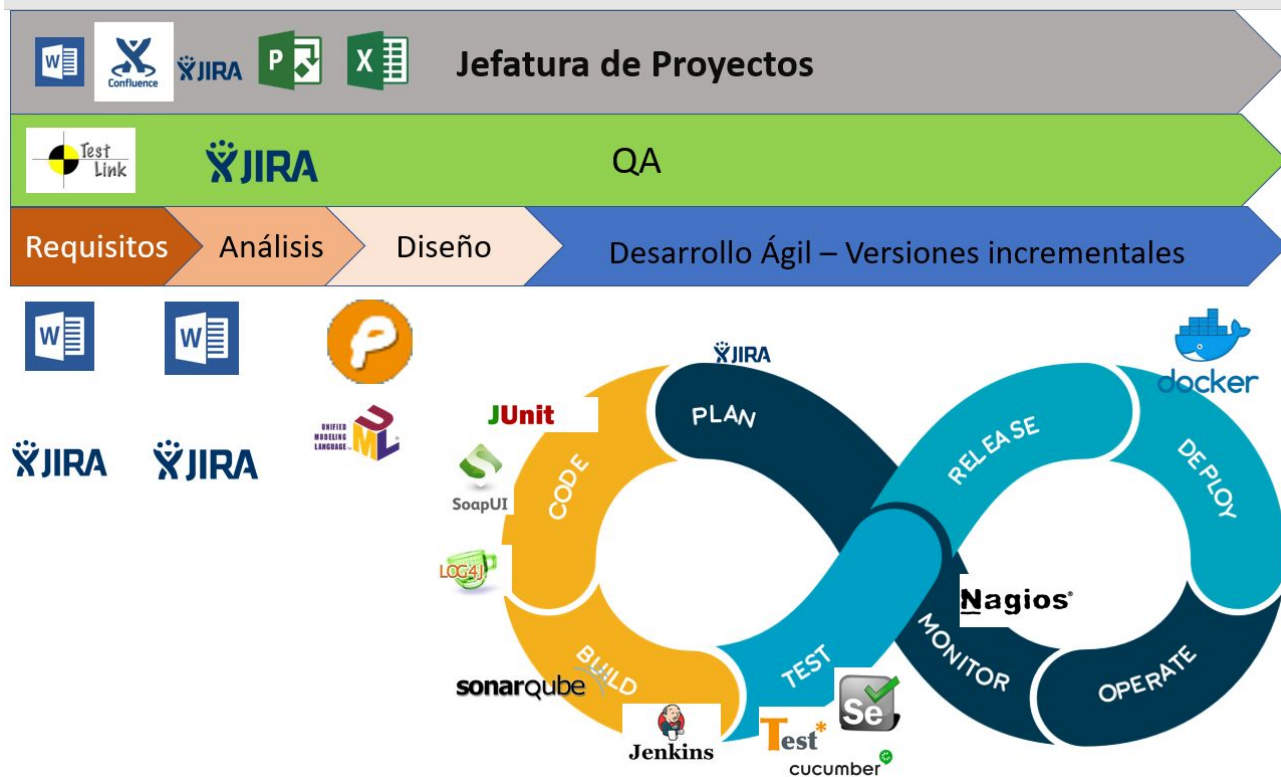
Current testing tools already integrated into the CI/CD

USE CASE - Redefine testing

- Redefine the testing concepts taking into account the recommendations of ISTQB and best practices
- Define a test plan and involve developers and QA
- W- Model. Test everywhere and automatize test



USE CASE - New testing process

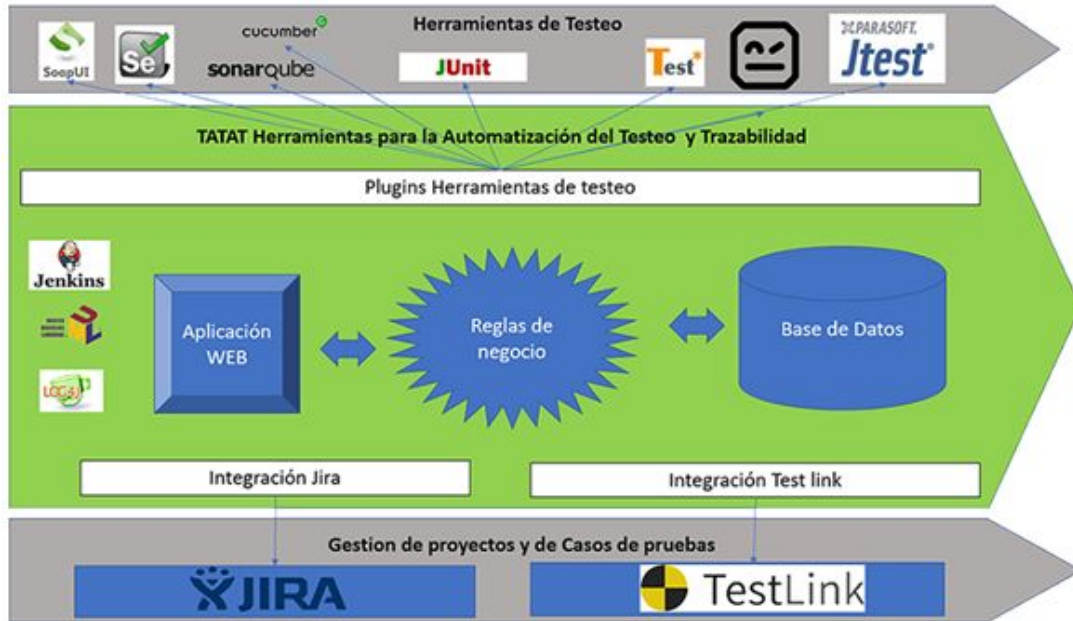


New testing agile process

New tools integrated into the process:

- Devops
- Testing
- Development
- Management

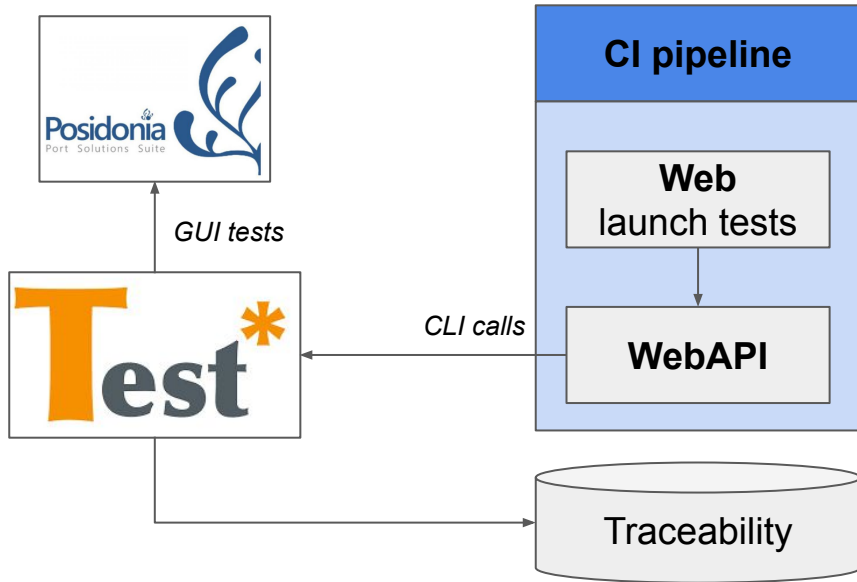
USE CASE - Traceability and Test Automation Tools (TATAT)



The TATAT toolset (Traceability and Test Automation Tools) is a set of **utilities and developments** implemented and integrated by Prodevelop **to support the traceability** of errors and which is based on the proposed traceability model. This set of tools helps the **automation of functional and non-functional tests**.

Testing tools and management tool independent

USE CASE - TATAT - The Test* tool integration



Test* is a scriptless GUI based testing tool developed by OU and UPV researchers.

<https://testar.org>

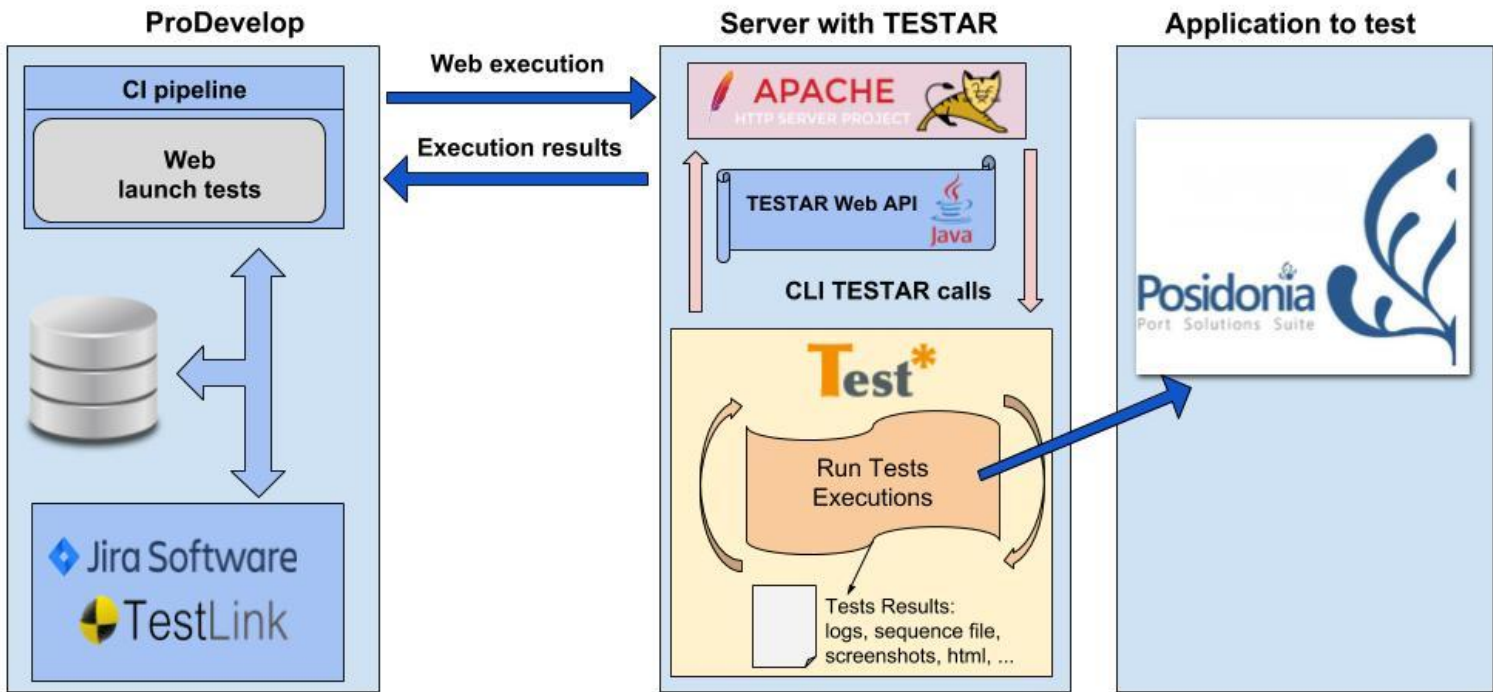
It has been adopted by Prodevelop to test Posidonia.

Prodevelop has extended with the development of a Web and WebAPI to call Test* tool from CLI and integrate it into their CI pipeline

From academic research to the real-world tool chain

TRL5

USE CASE - TATAT - The Test* tool integration



From academic research to the real-world tool chain

USE CASE - Evaluation Metrics

Preliminary results of the most relevant KPIs of the TESTOMAt project results dashboard:

KPI	Initial	Current	Project Target
% of tests automated (capture & replay)	0	10	30
% of tests automated (api)	0	0	0
% test automated (unit test)	30	35	40
% test automated (random)	0	20	50
Hours saved in this iteration	0	16	32
Number of errors detected by random testing of UI	0	2	8

CONCLUSIONS

- Prodevelop in collaboration with Open University and Mondragon Unibertsitatea has **integrated two research outcomes** in their day-to-day software product life cycle.
- The solution proposed is based on models, they are technology independent
- More testing tools will be integrated in the future

FUTURE LINES

- Prodevelop will add specific test oracles for Posidonia SUT.
- Test* will apply AI/ML to make the selection of actions smarter
- Posidonia & Test*, enhancement of tests and web oracles
- Integration of jira and testlink tools

ACKNOWLEDGEMENTS

- This work was partly founded by TESTOMAT project
- And country founding agencies
 - Centro para el Desarrollo Tecnológico Industrial (CDTI)
 - Agentschap Innoveren & Ondernemen





**JISBD
2019**

Thank you!

